The RARS EXCITER

RALEIGH AMATEUR RADIO SOCIETY
RARS
WORLDWIDE FRIENDSHIP

No 295, October 1994 - Repeaters: 146.64-, 444.525+, 444.95+ BBS: 772-9176

Code-free! *Test-free!*

THE EXPERIMENTER'S RADIO BAND: BUILD YOUR OWN LONGWAVE STATION

Radio Limbo: How low can you go?

Longwave is a general term for long-wavelength radio, which includes a unique but little-appreciated experimenter's band from 160 to 190 kHz. This band is sometimes called the 1750 meter band, for it's long wavelength! Let's take a look at the properties of this band, and see how we can get up and running with readily available (or easily made) equipment.

ANY person can TRANSMIT, without a license in the 1750 meter band! That's right - provided you meet the requirements for operation in this band, contained in FCC Rules and Regulations, Part 15. 1750 meters is NOT an amateur radio (ham) band! People that operate in the band sometimes call their stations (and themselves!) LowFERS, for Low Frequency Experimental Radio Stations.

Propagation is similar to that on the familiar AM broadcast band: high summer static levels, good night-time skywave propagation, and frequent fading of weak sky-wave signals. Man-made (especially power-line) noise can be an even greater problem on longwave than in the AM broadcast band! Generally, daytime reception of longwave

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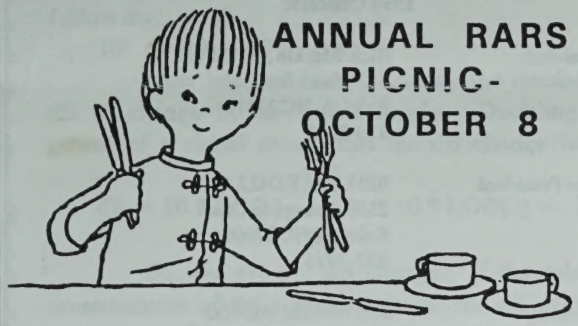

ANNUAL RARS PICNIC- OCTOBER 8

The annual RARS picnic will be held on October 8 at the ABB plant on U.S. 1 North (Capitol Blvd). Festivities will begin around 2PM, and the feasting will begin around 4PM. A pig, barbequed in the inimitable WA4MJF style, along with slaw and other goodies will be provided, but everyone is encouraged to bring their favorite covered dish and/or dessert. Rumor has it that there may be a dessert tasting contest, so be prepared.

All RARS members, families and guests are invited to attend.

For more information, contact Bill KD4LLQ, 832-7975.

Curt KD4YU

The Raleigh Amateur Radio Society, Inc. (RARS), founded in 1969, has grown to be one of the premier radio clubs in North Carolina. Current membership is over 400.

The objectives of the club are to promote world wide friendship through Amateur Radio; to be of public service by providing radio communication in times of disaster, emergency, or civic need; to educate members in radio technique, and to assist in obtaining Amateur Radio licenses.

All persons interested in Amateur Radio, currently licensed or not, are eligible to apply for membership to the club.

Dues to the club are $18.00 per year (which runs from July 1 to June 30). Applications for membership may be obtained from any of the officers named below; from the newsletter editor, named on the facing column; or at any RARS Meeting.

Club meetings are held the first Tuesday of every month, 7:30 PM, at Forest Hills Baptist Church, on the corner of Clark Avenue and Dixie Trail, just off of Hillsborough Street.

In addition to the many social and special events, the club sponsors a 2 m repeater, W4DW, on 146.04/64 MHz. The club also sponsors repeaters on 223.04 / 224.64 MHz, 449.5 / 444.5 MHz, 449.95 / 445.95 MHz and a packet cluster node on 147.57 MHz. All repeaters cover Raleigh, and most of the surrounding Wake County area. The auto-patch on W4DW is now no longer closed and is open to all duly licensed amateurs.

1994 Officers:

President:	Rick Merkle, KA3PSK 6412 Sassafras Lane Raleigh, NC 27614 870-8268
Vice President	Bill Lyon, KD4LLQ 2351 Champion Court Raleigh, NC 27606 832-7975
Secretary:	Jeff Wittich, AC4ZO 211 Dundalk Way Cary, NC 27511 362-9456
Treasurer:	Mike Murphy, WA4BPJ 7329 Barberry Court Raleigh, NC 27615 847-4641

The EXCITER is published monthly by the Raleigh Amateur Radio Society, and is mailed at no cost to its members.

Letters to the Editor, technical articles, items of interest to the ham community and guest editorials are actively solicited.

Any article published in the EXCITER does not necessarily represent the views of, the Officers, Board of Directors, Editor, or Society Membership, nor does publication thereof represent concurrence by the Officers, Board of Directors, Editor, or Society membership with the contents of the article.

Articles will be printed at the discretion of the Editor, and no article will be published unless it is accompanied by the name(s) of the person(s) submitting the article.

All copy must be in the hands of the editor by the end of the Board of Director's meeting on the third Tuesday of each month. Articles submitted for publication may be hand or type written, an ASCII file on disk transmitted electronically via telephone modem, or on the ham bands using PACKET.

Ham related items for sale by the members will be advertised without charge for one issue, but may be re-submitted as often as desired. These ads must be non-commercial in nature.

Commercial ads will be run in return for the following donations to the club:

	Single Issue	Full Year
Business Card	$7.50	$75.00
Quarter Page	$11.25	$112.50
Third Page	$15.00	$150.00
Half Page	$22.50	$225.00
Full Page	$50.00	N/A

(Commercial ads must be of "camera-ready quality," and obviously can not be sent via ham bands.) Due to the reprographic process used, no color copy can be accepted.

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SPECIAL SERVICE CLUB

Young Ladies' Radio League

AMSAT

SOUTHEASTERN REPEATER ASSOCIATION SOTA MEMBER

WHY "DB'S" ARE RELATIVE TO YOU

Have you ever heard your favorite resident hamhead on the repeater trying to impress everyone with some awesome geek speak? Odds are if you have, you've heard the term "dB" (pronounced "dee-bee") tossed around. So what the heck is a dB, and why is it relative to you? And while we're at it, where can you get a deciBel meter (it's like an Ohm meter, but it measures dB).

Let's answer the easy one first. You can't get a deciBel meter. They were last manufactured around 1926, and were a great commercial failure because they didn't have a ground lead on them like most measurement equipment. What's that, you say? No ground lead! But ground is the common reference point for all measurements. How can this be?

The answer is that when measuring volts, amps, and many other things, ground is the basis for measurement. That is because the thing you are measuring is absolute. The dB is a measure of the amount of CHANGE in a value. The exact measurement of the value is not important, it is only the amount of change or the RELATIVE value that is important. This is a little different than the normal amateurs' 12 volt, 100 watt 50 ohm world of absolutes. (By the way, a "math watch" has just been posted for this article.)

So it is clear we must think of dBs as being a relative problem. Up until now, the only relative problem most of us had was when our mother-in-law came to visit. We now have a second one: The Decibel (which is "dB" for short). Let's look at the formal definition of the decibel. (Attention: the "math watch" has just been upgraded to a math warning.)

A decibel is ten times the log of the power ratios of two signals. In formula form it is:

$$dB = 10 * LOG\left(\frac{\text{Power after}}{\text{Power before}}\right)$$

As you can see, we are looking at the ratio of the powers, not their absolute values. Before your eyes completely gloss over, let's look at an example. If you double your transmit power in your rig from 50 to 100 watts, the ratio of the powers is 2. If, however, you doubled the power of your hand-held two meter rig from 2.5 watts to 5, the ratio would also be 2. Even though there is a bit of difference between 5 and 100 watts, in both cases the power was doubled. This is why the dB is a relative measurement.

So what's a "log"? In addition to the paper you use to write down your QSOs on HF, the log of a number is defined as the value to which the number ten would be raised to produce that value. There go the eyes again. Lets look at an example. The log of 100 is two. Why? Because ten raised to the power of 2 is 100. Let's try that in equation form.

$10^2 = 100$, and, $LOG(100) = 2$

$10^3 = 1000$, and, $LOG(1000) = 3$

What you may not know is that you can raise the number ten to non-integer powers, and if you have a calculator with a log function (as all geek wannabees do), you can get those numbers. For example:

$10^{0.3} = 2$, and, $LOG(2) = 0.3$

Now to round out the math, please note the following:

$10^1 = 10$; $10^0 = 1$

Now lets use this to compute the number of dB of change in the first example. Doubling the power of a signal means that the dB change is:

$$dB = 10 * LOG\left(\frac{100}{50}\right) = 10 * LOG(2) = 3\,dB$$

So, we get a 3 dB change. If the relative measurement of the signals is more, the dB value is positive and it is called gain. If the relative measurement is less, the dB value is negative and it is called loss. If we had 100 watts of power at 2 meters and we used poor coax to get the signal to the antennae and lost half the power, then:

$$dB = 10 * LOG\left(\frac{50}{100}\right) = 10 * LOG(0.5) = -3\,dB$$

Rather than say that the coax has a negative gain of 3 dB, we say the loss is 3 dB.

So who's the brain dead geek who thought this was a good way to measure stuff in the first place? The answer is mother nature (sorry about the "brain dead geek" reference, mom). It turns out your ears detect changes in volume logarithmically, and your eyes are sensitive to light logarithmically.

In fact, a 3 dB change in an audio signal (twice the power) is perceived by humans as a slight change in volume. A 10 dB change is what we might call "much louder." If you could flop back and forth between two signals that differed by one dB, you would eventually conclude there was a slight difference.

This means that if you had your HF rig at 100 watts, and took the power up to 125 watts, no one would hear the difference. This is a little counter intuitive, since 25 watts seems like a lot of power. Even taking the power to 160 watts is only a 2 dB increase and will barely be noticed by a few. Taking the power to 200 watts (FT1000 range) will give you a 3 dB change, which everyone will notice as a very slight increase. At 1000 watts, you have a 10 dB increase and everyone will acknowledge that you are "two to three times" louder than the next ham. Now you know why there isn't much of a market for 300 watt amplifiers.

So measuring in dBs allows us to realistically figure out what the impact of loss and gain in your ham shack's equipment means to the end focus of our attention, they guy you're trying to tromp all over so you can work that rare station you haven't gotten yet. There is another reason for dBs, which you probably don't care about unless you have your geek merit badge rating up past about level 3. dBs allow you to figure out your total system performance without having to use multiplication. Huh?

An interesting quirk of logarithms is that if you add up the logs and then take the antilog, it is the same as multiplying the numbers. In other words (equations, actually):

$$10^{(\log(x) + \log(y) + \log(z))} = x * y * z$$

This means that if your amplifier has a gain of 8, your coax has a loss of 30%, and your antennae has a gain of 6 your total system gain is $8 * 0.7 * 6 = 33.6$. The above could also be expressed as follows below:

If your amplifier has 9 dB of gain, your coax has 1.6 dB of loss, and your antenna has 7.8 dB of gain, the total system gain is $9 - 1.6 + 7.8 = 15.2$ dB (of gain).

Since it is easier to add and subtract than to multiply, dBs are used in describing the loss and gain in a system so that the "bottom line" performance can be quickly figured out, possibly in your head without the use of a calculator. The end result is also more useful since there is usually a pair of human ears at the receiving end.

Finally, dBs keep us hamheads humble and in touch with reality. The total loss of signal power from your transmitter to the receiver can be on the order of 110 dB. Doesn't sound too bad, does it? This sounds much better than saying the total loss of the signal traveling through the air is 100 Billion. Think of how much smaller the United States deficit would be if it was expressed as only a 126 deci-Dollars above a dollar (instead of saying it is 4 trillion). Notice that I had to say "above a dollar". If you want it reference it to a penny, add 20 deci-Dollars and reference it to a penny. As you can see, money and dBs don't mix. If you lost 1 dB at ten meters (28.6 MHz) with your 100 foot run of RG-8X coax, you probably couldn't hear it and wouldn't care. If I were to attenuate the $ 100 in your wallet by 1 dB (making me $ 20 richer), I would definitely hear about it and you would definitely care.

So there you have it... the origin and use of dBs in this relative world. Now if I only had a 40 dB attenuator for my mother-in-law....

Pete Hallenbeck WA1YYN

LONGWAVE

continued from page 1

signals is limited to groundwave. At night, skywavepropagation often allows reception from stations several hundreds (and even several thousands) of miles away! It's best to try listening for longwave signals at various times, since solar disturbances, magnetic storms, and "general openings" (which recur on a 27-day solar rotation period) provide enhanced propagation. Although winter is the "classic" longwave DX season, many unique DX catches have been accomplished in other seasons, even in July and August (especially in the predawn hours, when the noise is lowest). Day-to-day, hour-to-hour, and even minute-to-minute variations in signal levels can be found, which makes longwave extremely interesting (and challenging!) to monitor. And when you can't hear any of the experimenter's signals, you can DX the NDBs (nondirectional beacons), a fascinating collection of maritime and aeronautical beacon stations in the 190 to 535 kHz range.

The experimenter's 160-190 kHz band is shared with some wicked signals from GWEN, the

Ground Wave Emergency Network, whose Relay Node stations pumps out huge packet radio signals in the range 150-175 kHz. GWEN stations are part of a military emergency communications system designed to be immune to effects of high altitude electromagnetic pulse, such as could be generated by high altitude nuclear burst. Since the GWEN signals are so loud compared to the experimenter's signals, many LowFERS prefer to operate their transmitters between 175 and 190 kHz. The band is also populated by power utilities.

You can receive longwave signals on many amateur or shortwave listener band receivers. Any receiver that can tune to the longwave frequencies you are interested in can be tried. Some fairly low-priced general-coverage portable shortwave receivers do a VERY good job at receiving longwave, even when using the internal ferrite bar antenna! These include the Magnavox D2935 (alas, discontinued!) and Sangean ATS-803A. Try experimenting with antennas to optimize reception. Sometimes minor changes make a big difference! If using an internal ferrite loop antenna in a portable receiver, move the receiver to a different position or orientation on the table; or try it in a different room. Hook on a wire to the telescoping antenna. If using a general-coverage receiver portion of a ham transceiver, you may not get good results on longwave, even if the rig tunes down to 30 or 100 kHz; many of these rigs have low sensitivity at these low frequencies. Solution? Use a converter! There are converters available commercially (or build one yourself!) to convert longwave to the 80 meter (or other) band. I use a Curry Communications 80AU converter (and random wire antenna) with my Kenwood TS-440S tuned to 80 meters, with very good results! We are dealing with weak signals from LowFERS, so receiving performance is a top priority.

What about transmitting? There are transmitters commercially available, but you can build your own for literally one-tenth the price! Even if you don't have a well-stocked junque box, some scrounging at a swapfest should allow you to obtain the parts for a first-class beacon transmitter for well below ten or twenty dollars. Check the circuits in Ken Cornell's scrapbook for some simple but effective designs. These transmitters are effective but very simple. My favorite design is an oscillator composed of two ICs, and a one-transistor amp. Works like a champ!

The rules governing 1750 meter transmitting basically limit power to less than one watt. Also, the total length of the transmission line and antenna must not exceed 15 meters. Thus most LowFERS install the transmitter on or near the antenna. A remote control cable is then used to provide transmitter control and modulation signals. If top hat radials are used to increase antenna capacitance, the conservative LowFER interprets the "15 meter rule" to include the radial length in the total antenna length; thus a 35-foot base-loaded vertical with 15-foot tophats is generally considered "legal".

CW is the most popular mode of beacon operation, but most any mode is legal. LowFERS in California have been using coherent CW and Packet, as well as sideband, for 2-way communication on the band! Call signs (identifiers) can't be a ham callsign or that of any other radio station, but within those restrictions, the operator is free to choose the ident he or she wishes to use. Hams often identify their beacon with the suffix of their call. Beacon keyers can be built yourself, or ordered from one of several people supplying EPROM-based circuits in the $17-36 range. I just finished a one-letter beacon keyer which cost less than $10 in parts! Adding AM or double sideband capability to a longwave cw transmitter is very easy.

The majority of LowFERS are found in California, and North Carolinians need to get some representation! No listings for an active LowFER beacon in North Carolina can be found in the club bulletins! I have been building a beacon station which should be running by this winter, and several others in the area are working on receive and/or transmit capability. If enough of us get into the act, we should be able to hold a 1750 meter Triangle Net! So let's take the challenge of LowFER operation.

Part 15 gives anyone with an interest in experimenting a "free reign" (within the specified limitations) in a unique and fascinating region of the radio frequency spectrum! If you are interested in further information on the 1750 meter band, I encourage you to check into the resources listed below. Also, please

keep me informed of your LowFER activities as I would like to start meetings with interested people in the Triangle. (Inquiries are also welcome; I have a more extensive bibliography available.)

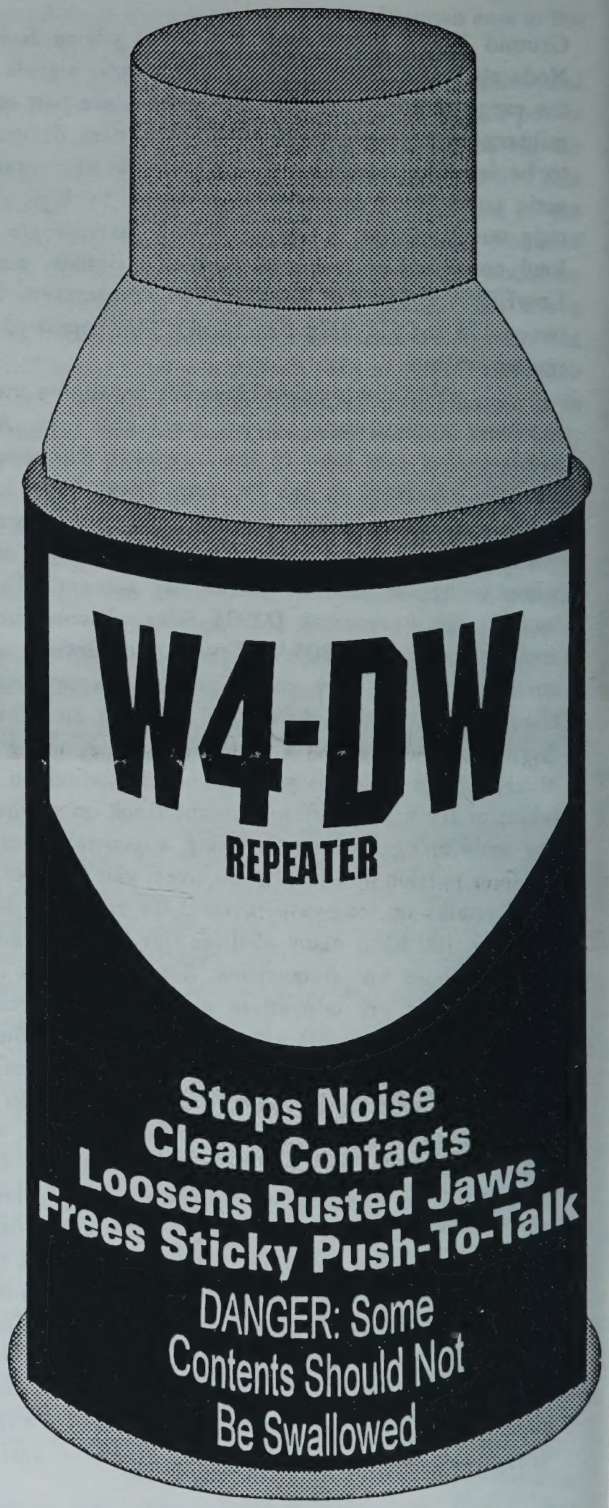
Dave Johnson, WA4NID
2522 Alpine Rd., Durham, NC 27707
(919) 489-1257 (voice and FAX)
email: djohnson@acpub.duke.edu
packet: wa4nid@kb4wga.nc.usa.na

RESOURCES FOR LONGWAVE ACTIVITIES:

THE LONGWAVE CLUB OF AMERICA, c/o Bill Oliver, 45 Wildflower Road, Levittow, PA 19057. The LWCA is a great organization consisting of hundreds of members, mostly in the USA; it was formed in "1974 to promote DXing and experimenting on frequencies below 530 kHz and activity on the 1750 meter band." Their monthly publication, the LOWDOWN, is essential reading for anyone interested in longwave! The LOWDOWN includes reports of loggings and two-way contacts, changes in NDB operations, reports of QSLs received, and more! Membership in LWCA and one-year subscription to the LOWDOWN is $18.00 in the USA; remittances in U.S. funds (such as check to LWCA) to the above address.

THE LOW AND MEDIUM FREQUENCY RADIO SCRAP BOOK, 9th Edition, 1994. This book, or a previous edition (preferably 6th edition or later unless you want to use primarily tube-type circuits!) is a must-have compilation of proven designs and schematics for transmitters and receiving accessories from the medium frequency to the audio frequency range. Obtainable from the author, Ken Cornell, 225 Baltimore Avenue, Pt. Pleasant Bch., NJ 08742 (write for current prices; my latest info says $17.50 postpaid).

CURRY COMMUNICATIONS, 737 North Fairview Street, Burbank, CA 91505, phone (818) 846-0617. This company supplies kits for longwave and 1750 meter band. If you want to get "on the air" and don't want to homebrew your rig, but wouldn't mind building a kit, then how about a 1750 meter CW transceiver kit for around $90! Ask for a catalog of all their products!



SCANNER/SWL SIG REPORT:

WE'RE A RAMBLING SIG

The September meeting of the Scanner/ SWL SIG was held on the 19th (third Monday, as always) with 11 people present.

The meeting was held at the South Hills Seafood Restaurant in the South Hills Mall. Although this has been the most common SIG meeting location for the last few months, next month we will be meeting a Mr. B's restaurant on Western Boulevard. Mr. B's is in the building that formerly housed the Golden Corral Steakhouse, our former meeting location.

Since our last report we have had several excellent meetings. In August we visited the Sprint cellular site in Garner, and had an excellent opportunity to see a full featured cell and switchgear site as well as learn about cellular operations in general.

In September we had a "roundtable" meeting, where each attendee told of their most interesting listening experience and told about some of their radio equipment and what they liked and disliked about it.

At all of our meetings there are handouts of various interesting information, including hard copies of the Triangle Scanner Frequency list.

FREQUENCY LIST UPDATE: Tom McKee K4ZAD is updating the Triangle Scanner Frequency list, so if you have some new frequencies, let us know. Contact me on the RARS BBS or by voice.

NET: Remember the Scanner/Shortwave Listening net, held every Monday night (except meeting night) at 9:30PM on 146.64 MHz, the RARS 2 meter repeater. Give us a check out and a check-in to let us know what you're hearing, to find out what others are hearing and to exchange general information on scanning and shortwave listening.

NEXT MEETING: The next meeting will be held on Monday, October 17, 1994 at Mr. B's restaurant, as listed above. The topic is not finalized yet, so stay tuned to the net or give me a call.

At present there are no dues or fees for participating in the Scanner/SWL SIG. If you have non-ham friends interested in scanning or SWLing, please invite them to attend. For more information on any of these topics, call me on the .64 machine, E-mail me on the RARS BBS or the Triangle TeleComputer BBS 919-772-9745, or call me (voice) at 919-772-0207.

Curt KD4YU

RARS ADOPTS POLICY FOR SPENDING ON OUTSIDE GROUPS

It's no secret that RARS has a pretty hefty budget. The Hamfest, plus dues from 400+ members, give us a substantial treasury, a fact that has been noticed by other ham groups around the Triangle.

Each year, RARS is approached by various hams, asking us to donate to, fund or underwrite generally worthwhile projects. And while most years, the board has to struggle to make the budget balance, there is usually at least some money available for these projects.

For example, in this fiscal year, RARS will be buying some kind of packet networking equipment to be used by the Wake Digital Communicatons Group to upgrade the packet network in the area. RARS has chosed to assist WDCG with this effort, rather than duplicate efforts and take on the project ourselves. RARS will also be funding part of the ATV repeater being built by the Triangle ATV Assn.

But with a few limited exceptions, RARS is NOT interested in just handing out money. At the August board meeting, the directors voted to adopt the following policy, and make it available to groups seeking funding from RARS:

RARS Budgetary Allocation Policy/ Fund Disbursement Policy

It is not the intent of RARS to become a benevolent benefactor for other Ham Radio organizations or projects. RARS may, however, allocate funds for the purchase of specific, identifiable pieces of equipment which shall then become the sole prop-

erty of RARS, but will be installed, operated and maintained by outside groups.*

A group that wishes to request that RARS purchase a specific item for that group's use should make a presentation to the RARS board of directors prior to the April and May budget meetings. In the presentation, the group describes their project, how it is beneficial to Ham Radio, the community, etc., and what specific equipment they wish RARS to purchase.

During the April and May board meetings, the board will consider all the information furnished by each requester, along with the financial requirements of the Society, to produce a budget proposal for presentation to the general membership at the June meeting. The adoption of a budget by the membership is not a mandate to spend the money allocated to each line item — it is an approval for the board to spend up to that amount for that purpose during the next fiscal year. If a group's request for funds has been incorporated into the budget, the board retains the authority to reduce, or exclude altogether, the expenditure of funds for that line item.

* RARS may, at its discretion, make cash contributions to outside groups. Cash contributions will generally be reserved for purely public-service organizations like ARES and SKYWARN.

NEW FCC SERVICE

The FCC has instituted a toll-free phone line at its Gettysburg, Pennsylvania licensing division for customer service inquiries. Amateurs may call 800-322-1117 weekdays between 8 AM and 4:30 PM Eastern Time to access an automated information system with recorded messages on interference complaints, form requests, records, and Amateur Radio call sign assignments.

Other messages regard fee information and processing times. A TouchTone telephone is required.

The FCC said the new service was part of its response to a presidential order that the federal government be "customer driven." The FCC said it used a series of focus groups with external customers to identify the desire for an 800 number at its licensing division.

"Within the next 18 months," the FCC said, "customer service standards will be developed for other areas of Commission operations to ensure that FCC customers receive the highest quality of service possible. As these new standards become available, the FCC will inform its customers."

ARRL Bulletin

NEW DX CHALLENGE: DUMPSTER DX'ING!

For those of you who've managed to DX and QSL such esoteric signals as garage door openers, wireless dog fences, and moose tracking tags, I have a new challenge: DUMPSTER DX'ING.

Per a brief article in RF Design:

Mandatory recycling plans in many communities are becoming a challenge for consumers and waste collection companies alike. In the city of Santee, California, Texas Instruments' TIRIT RFID transponders are attached to the various color-coded trash bins containing the various types of waste. As each is dumped into the collection truck, the RFID tag is read and the information on the household and the contents of the bin is recorded. The data is used to generate reports for evaluation of the recycling program, including the number of bins containing recyclable material, and how often each household sets out the bins. The information can also be used for time-and-motion studies of route performance, such as time per stop, time between stops, and transport time to landfills.

No information was provided regarding frequencies. It will also be tough tracking down QSL signers, who, instead of colorful station pennants, will likely include slices of soggy pizza with your verification!

AL QUAGLIERI
via the FidoNet SWL echo

The nightly RARS 2 METER NET
meets at 8PM
on the 146.64 MHz RARS repeater

NEW 10 METER REPEATER

There is a new 10 meter repeater on the air locally. The frequency is 29.680 MHz output, with the repeater input on 29.580 (you need to set your transmitter for a -100khz shift). The receiver is currently up about 170 feet in Wendell, NC while the transmitter is temporarily located about 13 miles northeast of Zebulon and runs about 50 watts output. The transmitter will be moved about 3 miles from the receiver in the Wendell/Zebulon area soon. The repeater is operating in the beacon mode (much like the RARS 6 meter repeater) and ID's every 10 minutes, even when not in use.

The repeater receiver, transmitter exciter, and controller are homebrew, while the UHF split-site linking equipment is converted Motorola Micors. The noise amp/squelch circuit was "reappropriated" from a UHF Micor. Audio processing is via LM324s and the circuit was borrowed from the custom audio board by the guys in the Armadillo network. The receiver preamp is a commercial GaAsFet job tuned down to 10 meters. The PA is a solid state amateur 100 watt amp with the input padded to 50 watts and "blowerized" for continuous duty. Both receiver and transmitter antennas are modified 5/8 wavelength CB antennas shortened for 29 mhz.

Give it a try and have fun with DX during band openings!!

73, Dave Hockaday WB4IUY

The **RARS Crystals**
(sort-of a YL SIG) meet
on the third Tuesday of each month
at Ryan's Steakhouse
in Crossroads Plaza in Cary
at 6:30PM.

Not that you'd ever know it
from their input to *the Exciter*. :-)

SPUR PLAGUING 64 IDENTIFIED

Jerry KD4YJV is a sharp-eared Sherlock 'Ohms. He has identified the transmitter that has been blipping the RARS 146.64 repeater for the past several months.

If you've used the repeater much at all this summer, you've heard the strange voices — usually a just a few syllables, sometimes a whole sentence, peppered at random between ham transmissions, and sometimes on top of weaker ham transmissions. It came and went, never really qualifying as "interference," but always annoying. We could tell the signal "swept" by the repeater input, starting above or below .04, and crossing our channel, sometimes quickly, sometimes slowly.

We asked repeater users to monitor the input frequency, 146.04, to see if we could isolate the source. At first, I heard a weak signal in north Cary. Then Fred KE4IXL heard it stronger in Chapel Hill. From what little we could make out of the transmissions, it sounded like a business-band transmission, perhaps some sort of dispatching, since partial addresses and directions were frequently heard.

Finally, Jerry KD4YJV recognized the transmission. He had heard it before, while listening on a business-band radio. Jerry contacted Mike WA4BPJ, who monitored the business-band channel and confirmed the source. Some, but not all of the transmissions from that particular transmitter also keyed up .64.

To further confirm that the transmitter in question actually had a "spur," Chuk KB4MDZ, RARS Repeater Chairman, along with Mike and the Murphy family, and Bill KD4LLQ, visited the business in the western Triangle area. Chuk brought along his trusty service monitor/spectrum analyzer. Set up in the parking lot next to the business, Chuk had a clear view of the signal as it wandered across a short segment of the 2-meter ham band.

Although the business-band transmitter was not designed for wide-area coverage, the spur had some power behind it. Not only was it keying up the RARS .64 repeater in Raleigh, it was also hitting

ROSTER UPDATE October 1994

KB2ACE	G Matt	Reynolds	no-home-phone	259 St. Paul Street	Brookline	Mass	02146
KR4AS	A Richard	Saccoccia	919-662-5165	3500 Vesta Drive	Raleigh	NC	27603
KD4BMA	T Clement	Matthews, Jr.	919-552-3233	702 Lakewood Dr.	Salisbury	NC	28147
WA4BVY	E Terrence	Rogers	919-361-1881	5205 Silkwood Dr.	Durham	NC	27713
KE4ENB	T Daniel	Matthews	919-467-3528	740 Linda Ct.	Cary	NC	27513
W2EZS	G Paul	Reynolds	no-home-phone	PO Box 4076	Queensbury	NY	12804
KE4FCJ	T Pat	Fix	919-878-4634	3151-F1 Calvary Dr	Raleigh	NC	27604
K4FGO	A Melvin	Veach	919-782-4909	505 E. Millbrook Rd.	Raleigh	NC	27609
N3GO	E Gary	O'Neil	919-854-4902	7601 Cypress Wood Court	Raleigh	NC	27606
KB4HG	A Rhett	Isley	919-639-1030	P. O. BOX 1681	Cary	NC	27512
AB4IO	E Don	Williams	919-772-1315	1501 KENBROOK DRIVE	GARNER	NC	27529
KD4IRZ	T Robert	Orander	919-217-0237	9301 Poole Rd.	Knightdale	NC	27545-9173
KE4IXK	T+George	Weinstein	919-380-0485	101 Okelly Ln.	Cary	NC	27511-5529
KE4IXL	A Fred	Decker	919-481-2238	121 Adventure Trail	Cary	NC	27513
KE4IZO	T James	Ashton	919-460-6526	921 Amber Hill Circle	Garner	NC	27529
KE4IZS	T Linda	Peacock	919-876-0071	6604 JOHNSDALE ROAD	Raleigh	NC	27615-0410
KE4IZZ	T Fontella	Spratley	919-662-1626	106 TAFTON COURT	GARNER	NC	27529-4325
KA2JFG	A Betty	Hazelbower	919-693-5296	6777 Hwy 96	Oxford	NC	27565
KE4LEH	T Peggy	Adams	919-848-1821	720 Sawmill Rd.	Raleigh	NC	27615
KD4LLV	G Joe	Simpson, Jr.	919-477-1481	5910 CRABAPPLE ROAD	DURHAM	NC	27712
KE4MEK	T Dorothy	Foster	919-552-7451	1409 Andersonwood Dr	Fuquay-Varina	NC	27526
KE4MEL	T Victor	Bur	919-872-3074	4332 Hickory Ridge Dr.	Raleigh	NC	27609
KE4MEM	T Van	Foster	919-552-7451	1409 Andersonwood Dr	Fuquay-Varina	NC	27526
KE4MEN	T Ken	Mock	919-552-9573	521 Woodman Dr.	Fuquay-Varina	NC	27526
KE4ML	A John	Coan	919-781-8999	6212 Winthrop Dr.	Raleigh	NC	27612
WA2MNN	T+Roger	Boyles	919-967-9515	Blakes Drive	Pittsboro	NC	27312
KE4MZD	T Tim	Fowler	919-772-5859	1011 New Rand Road	Garner	NC	27529
KE4NGM	T Betty	Orander	919-781-2328	6404 Chapman Court	Raleigh	NC	27612
KE4NKX	T Jim	Spratley	919-878-9030	7121 Beaverwood Dr.	Raleigh	NC	27604
KE4NLA	T Sam	Pearsall	919-859-6297	1307 Chaney Road	Raleigh	NC	27606
KE4NLB	T Richard	Burley	919-856-9755	623 Brooks Ave.	Raleigh	NC	27607
KE4NQA	T Dana	Trantham	919-481-2751	1327 Doylin Drive	Cary	NC	27511
KE4NQC	T Steven	Smith	919-846-4065	7411 Post Oak Rd.	Raleigh	NC	27615
KA4NSA	T Alan	Plaks	919-787-7095	1205 Country Ridge Drive	Raleigh	NC	27609
KE4PPW	T Nancy	Brown	919-556-8551	13033 POWELL ROAD	Wake Forest	NC	27587
AD4S	E James	Brigman	919-556-3958	6229 Winter Spring Drive	Wake Forest	NC	27587
KD4SMA	T Bill	Ashton	919-881-9535	1921 #F North Hills Drive	Raleigh	NC	27612
KA2TLY	T Laura	Ellis	919-556-5195	5400 Thornburg Dr	Wake Forest	NC	27587
AD4UL	E Douglas	Sweet	919-481-1102	922 NORTHWOODS DR	Cary	NC	27513
KC4UOS	T Susan	Hyte	919-554-0572	308 Dawn Ct.	Youngsville	NC	27596
KC4UQO	A Bill	Bressler	919-677-1891	103 Belclaire Court	Cary	NC	27513
N4VWU	T+David	Guthrie	no-home-phone	3119-F1 Calvary Dr.	Raleigh	NC	27604
KD4WSD	T Edward	Hauptman	919-478-7532	184 Lake Royale	Louisburg	NC	27549-9595
WA4YMZ	G Gary	Rogers	919-772-8865	2833 Ringgold Dr.	Apex	NC	27502-7431
N4YTO	T David	Fix	919-878-4634	3151-F1 Calvary Dr	Raleigh	NC	27604
KA4ZBJ	T Sharon	Rogers	919-361-1881	5205 Silkwood Dr.	Durham	NC	27713
N4ZDC	T Thomas	Gladden	919-552-0514	392 Horseshoe Bend Road	Hudson	NC	28638
KD4ZVQ	T Thomas	Kunzmann	919-550-9038	11154 Buffalo Road	Clayton	NC	27520
—	—Alan	Wickersham	919-833-9851	2326 Sheffield Rd.	Raleigh	NC	27610
—	—Chester	Burroughs	919-362-4804	117 Windswept Ln.	Cary	NC	27511-8938
—	—Marlene	Walbek	919-387-9177	106 Loch Lomond Circle	Cary	NC	27511
—	—Susan	Aceti	919-460-1646	1636 Glengarry Dr.	Cary	NC	27511
—	—John	White	919-460-0948	315 H. Bargate Dr.	Cary	NC	27511

Winston-Salem's .64 at times, as well as the 146.67 repeater in Burlington.

At this point you might expect a happy ending — transmitter fixed, spur cleaned up, RARS repeater quiet, all's well. You might expect that... unless you've had experience telling people their transmitter has a spur! It's a lot like insulting their mother. They take it as a personal affront, no matter how gently and factually the circumstance is explained. You have to sit back and let them get over it for a little while. Then maybe they'll look into it.

This business owner was none to thrilled with the news, so we're in that patient waiting period as this issue of the Exciter goes to press. By the time you read this, hopefully the repeater will be nice and quiet, and next month we'll be able to bring you "the rrrest of the story."

Gary KN4AQ

[Actually the spur plaguing the RARS repeater was identified last month, but due to space limitations, the tale of the chase couldn't be told until now. –KD4YU]

ITU SPECIAL EVENT STATION

Special event station 8N3ITU is operating from the International Telecommunication Union 14th Plenipotentiary Conference. The station is set up at the International Congress Center in Kyoto, Japan, site of the conference.

ITU officials attending the conference who are licensed amateurs are allowed to operate the station. Japanese amateurs watch over the station and assist visiting amateurs. The station's sponsor, the Japan Amateur Radio League, asks operators to avoid "piling up" on 8N3ITU.

The operators also hope to have a station on amateur satellites, possibly AO-13.

The conference is scheduled to run until October 14. QSLs may be sent via the JARL bureau, or direct with an SASE to 8N3ITU, JARL-Kansai, 3-8-31 Daidou, Tennouji, Osaka 543, Japan.

ARRL Bulletin

HAITI OPERATION FREQUENCIES

For those interested in monitoring the military operations in Haiti, Steve Douglass posted the following "Top 150" frequencies to monitor on America On-Line. Those in bold are frequencies where activity has recently been reported. Frequencies 105-108 got lost in computer netherland.

Activity has also been reported (via CompuServe, AOL, Usenet and FidoNet) on the following frequencies (MHz): 3.050, 4.040, 4.299, 5.335, 6.363, 6.732, 6.683, 6.693, 6.738, 6.740, 6.983, 6.993, 8.560, 11.460

Frequency (Mhz) Mode Description

1. **11.176 USB GCS (Global Command System) primary**
2. **6.738 USB GCS primary nights**
3. 4.725 USB GCS nights
4. **8.993 USB GCS nights**
5. 9.014 USB Air Combat Command ops
6. 11.243 USB STRATCOM primary days
7. 6.761 USB STRATCOM primary nights
8. 6.812 USB MYSTIC STAR primary AF-1/ AF-2 SAMs
9. 11.246 USB GCS McClellan AFB/ MacDill AFB
10. 13.201 USB GCS
11. 13.215 USB GCS
12. 13.244 USB GCS
13. 5.680 USB search & rescue all military
14. 5.696 USB Primary USCG aviation
15. 8.984 USB Secondary USCG aviation
16. 6.697 USB U.S. Navy HICOM primary nights
17. 11.267 USB U.S. Navy HICOM primary days
18. 9.023 USB NORAD primary nights
19. 13.241 USB STRATCOM
20. 5.026 USB STRATCOM
21. 13.205 USB STRATCOM
22. 13.217 USB STRATCOM
23. 13.247 USB Mystic Star/Andews AFB
24. 16.091 USB ACC tactical ops

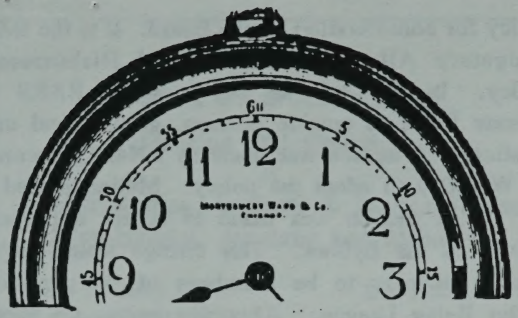
25. 10.780 USB Eastern Test Range/NASA
26. 4.082 USB Pacific Test Range/ Vandenburg AFB
27. 4.721 USB Mystic Star/Andrews AFB
28. 18.002 USB GCS all areas
29. 18.046 USB Eastern Test Range/NASA
30. 15.952 USB ACC tactical comms
31. 17.972 USB STRATCOM
32. 17.975 USB STRATCOM
33. 20.631 USB STRATCOM
34. 20.846 USB ACC tactical comms
35. 11.135 USB Navy HICOM tactical comms
36. 8.872 USB Navy anti submarine warfare ops.
37. 5.197 USB Air Mobility Command ops.
38. 18.027 USB AMC ops.
39. 11.214 USB NORAD
40. 5.297 USB NORAD
41. 9.793 USB NORAD
42. 10.194 USB NORAD
43. 10.452 USB NORAD
44. 11.284 USB NORAD
45. 11.441 USB NORAD
46. 14.364 USB NORAD
47. 20.855 USB NORAD
48. 4.760 USB AIR NATIONAL GUARD
49. 5.703 USB ANG
50. 5.745 USB ANG
51. 5.805 USB ANG
52. 5.827 USB ANG
53. 6.100 USB ANG
54. 6.714 USB ANG
55. 6.769 USB ANG
56. 6.800 USB ANG
57. 6.890 USB ANG
58. 6.895 USB ANG
59. 6.940 USB ANG
60. 7.460 USB ANG
61. 7.853 USB ANG
62. 8.731 USB ANG
63. 14.650 USB ANG.
64. 17.975 USB ANG
65. 6.715 USB Aerospace Rescue & Recovery Service
66. 11.440 USB Aerospace Rescue & Recovery Service
67. 4.277 USB USAF crash investigations
68. 4.467 USB Civil Air Patrol (CAP)
69. 4.627 USB CAP
70. 5.700 USB ACC tactical ops
71. 3.023 USB Navy search & rescue
72. 4.416 USB Navy HICOM Pacific Fleet
73. 4.377 USB Navy tactical nets
74. 3.095 USB Navy tactical nets
75. 3.265 USB Navy Atlantic Fleet tactical
76. 4.700 USB Navy Anti Submarine Warfare Pacific
77. 4.702 USB Navy Anti Submarine Warfare Atlantic
78. 5.446 USB USMC tactical nets
79. 6.687 USB USMC special convoys
80. 13.181 USB Navy HICOM Pacific
81. 6.673 USB Hurricane Hunters primary nights
82. 13.267 USB Hurricane Hunters primary days
83. 5.562 USB Hurricane Hunters Secondary nights
84. 4.540 USB Royal Air Force
85. 4.464 USB Royal Air Force
86. 4.742 USB Royal Air Force
87. 5.729 USB Royal Air Force
88. 6.690 USB Royal Air Force
89. 6.730 USB Royal Air Force
90. 8.990 USB Royal Air Force
91. 11.249 USB Canadian Air Force
92. 6.746 USB Canadian Air Force
93. 13.257 USB Canadian Air Force
94. 5.800 USB ACC tactical
95. 6.753 USB ACC tactical
96. 8.964 USB ACC tactical
97. 11.214 USB ACC tactical
98. 17.975 USB STRATCOM
99. 15.041 USB STRATCOM
100. 23.419 USB STRATCOM/ NORAD intercommunications
101. 11.191 USB U.S. Navy tactical Nets
102. 6.788 USB U.S. Navy Tactical Nets
103. 8.972 USB U.S. Navy aviation ops
104. 4.735 USB U.S. NavyContinued next file
109. 6.686 USB Mystic Star (Air Force One)
110. 6.780 USB NASA ops
111. 10.780 USB NASA ops (Cape Radio)
112. 9.017 USB USAF Global (GHFS)
113. 9.057 USB McClellan AFB (GHFS)
114. 11.191 USB USAF tactical Ops

115. 11.220 USB Andrews AFB (GHFS)
116. 11.229 USB USAF tactical
117. 11.243 USB STRATCOM
118. 11.248 USB USAF tactical
119. 11.413 USB USAF tactical
120. 15.021 USB NASA Cape Radio
121. 15.048 USB USAF tactical
122. 18.063 USB Andrews AFB (Mystic Star)
123. 5.803 USB USAF tactical
124. 5.718 USB Edmonton Military (Canada)
125. 6.776 USB USAF tactical
126. 7.919 USB Andrews AFB (GHFS)
127. 8.822 USB USAF (flight test ops)
128. 8.967 USB USAF tactical
129. 8.976 USB USAF tactical
130. 11.150 USB USAF tactical
131. 11.214 USB USAF/NORAD
132. 11.226 USB USAF (GHFS)
133. 12.056 USB USAF tactical
134. 15.015 USB USAF (GHFS)
135. 3.023 USB USAF search & rescue ops
136. 3.024 USB USAF search & rescue ops
137. 3.109 USB USAF search & rescue ops
138. 3.123 USB USAF search & rescue ops
139. 4.125 USB USAF search & rescue ops
140. 5.992 USB USAF search & rescue ops
141. 6.715 USB search & rescue ops
142. 9.006 USB search & rescue ops
143. 11.195 USB USAF search & rescue ops
144. 11.198 USB USAF search & rescue ops
145. 11.440 USB USAF search & rescue ops
146. 15.081 USB Navy/CG search & rescue ops
147. 15.084 USB Navy/CG search & rescue ops
148. 5.775 USB Lockheed flight test
149. 6.550 USB USAF flight test ops
150. 8.917 USB Lockheed flight test ops

Curt KD4YU

PUBLIC SERVICE EVENTS NEED YOU!

Public Service is one of the prime justifications for the existence of amateur radio. There are several up-coming public service events that need volunteers to help provide communications. Contact Doug AD4UL 481-1102 for information on how you can help. Your help is needed NOW!



MINUTES OF THE MEETING

Board Meeting

August 1994

The monthly Board meeting of the Raleigh Amateur Radio Society was held at the Forest Hills Baptist Church on August 16. The meeting was called to order by KD4LLQ at 7:05p. Members present at that time: KD4ACW, KN4AQ, WA4BPJ, KM4BU, KD4LLQ, KB4MDZ, WA4PEN, KO4QH, AD4UL, KD4YU, AC4ZO.

Motion by WA4BPJ to approve the June minutes as written. Seconded by KB4MDZ. None opposed. WA4BPJ gave the treasurer's report and said that membership is 296.

In his VP report, KD4LLQ said that Congressman Price will be at the September RARS meeting to speak about the bill he is sponsoring in Congress.

Bill also announced that the date for the RARS picnic is October 8. The location is the picnic shelter behind the ABB building on Capitol Blvd. just north of the beltline.

KD4ACW announced that the Kickoff meeting for the 1995 RARSFest will be held next Monday night.

KO4QH reported that she has received favorable feedback on the Education SIG that she is forming. This new SIG was announced at the August meeting.

KB4MDZ said that the spurious signal that has been interfering with the .64 machine has been identified. The responsible people have been notified and the trouble should be cleared soon.

KN4AQ presented a new RARS operating

Policy for consideration by the Board. It is the RARS Budgetary Allocation Policy/Fund Disbursement Policy. It addresses the way in which RARS will allocate funds to outside persons, groups, and organizations. A motion was made by KN4AQ, seconded by WA4BPJ to adopt the policy. Motion passed.

A motion was made to accept a proposed change to the Bylaws. This change would require RARS Officers to be members of the American Radio Relay League. After discussion, the motion was defeated.

AD4UL, Doug, announced that RARS will be assisting with public service events on October 1, 2, and 9.

KN4AQ said that a search is underway for a new Wake County Emergency Coordinator. The previous EC is no longer able to serve and is regretfully stepping down.

WA4MJF, Ronnie, has been asked by the Board to reinstate the initiative of attaining 501C-3 tax status for the Society.

Upon motion by KB4MDZ, seconded by AD4UL, the meeting adjourned at 8:35p.

Respectfully submitted,
Jeff Wittich, AC4ZO - Secretary

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Harnett County Campus
Lillington, NC, Phone (910) 893-9101

Serving the Optoelectronics Industry

For more information contact:
Steve Lympany - WA3TMR
Department Head - (910)-893-9101

CCCC is an equal opportunity college.

Regular Meeting

September 1994

The regular meeting of the Raleigh Amateur Radio Society was held on September 6, 1994 at the Forest Hills Baptist Church on Clark Avenue. The meeting was called to order at 7:36p by Rick KA3PSK who welcomed 106 members and 8 guests.

Mike WA4BPJ gave the Treasurer's report.

Congratulations were given to Erin Sobon for passing the 5 WPM CW examination in Shelby.

Jeff AC4ZO is arranging a group purchase of lightning protectors. Several models of Poly Phaser brand protectors are being offered. Contact Jeff with your requirements.

A survey form was included in the Exciter this month. This survey serves several items of the Five Year Plan by providing information for the formation of a "resource data base" that will be used to identify "Elmers" and candidates for certain committee members.

Ronnie WA4MJF announced that the data published in the Exciter for the ATV meeting is incorrect. The correct time is the second Thursday of the month at 6:00p at O'Malley's restaurant.

Rick KA3PSK announced a Foxhunt that will be held on Saturday, September 10 that is being organized be Bruce KC4UQN. The starting point is North Hills Mall at 10:00a. Talk-in on .64.

Doug AD4UL, the RARS Public Service Director, asked for help with several upcoming public service events. Contact Doug to sign up to help.

Gary KN4AQ discussed the HPM/125 celebration event. It is a week long event to celebrate the 125th anniversary of the birth of Hiram Percy Maxim (W1AW), the founder of the American Radio Relay League.

An announcement was made that Larry KD4IRV left his lights on in the parking lot. (applause)

Lynn KO4QH announced the fall classes.

The RARS TRADERS NET
meets every Thursday night
at 9PM on the
146.64 MHz RARS repeater

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10/94

N4IQA
Robert P. Buehlmann
Historian and Collector
of
Antique Radios, Artifacts & Documentation
Commercial, Amateur and Military
1314 Chaney Rd (919) 851-5169
Raleigh, NC 27606

5/95

KN4FL
JOHN P. SWAIN, JR., D.D.S.
225 Bryan Building
Cameron Village
(919) 833-3826 Raleigh, NC 27605

KC4KIC
Sam Johnson
Attorney
P.O. Box 1776
Raleigh, NC 27702 USA
Bus. (919) 832-8396
Res. (919) 787-0603
Johnson, Mercer, Hearn & Vinegar, PLLC

The class is for people who want to become hams, and covers material required to pass the Technician Class examinations. The class will meet on Tuesdays and Thursdays at the Westover United Methodist Church. Starting date is October 4, and runs for 6 weeks. Classes start at 7:30 (7:00 if you want to take CW) and the last day of class will be the test session.

Rick announced that the phone number for The Backdoor BBS operated by Errol has been changed. The new number is 319-3988.

Ronnie announced that the RARS annual picnic will be held on October 8 at the ABB building on Capitol Blvd. The food will be served at 2:30p.

Rick read a note that was received by Bob K4MC from the ARRL, thanking him for sending in news articles to the League. Bob had sent articles in June about Field Day and other ham radio related topics which appeared in newspapers in this area.

Lynn said that the Education SIG has had their first meeting. More members are needed. Contact Lynn to join.

Chuck K4HF announced that there are plans to have an Icom dealer and Icom America as guests at the October meeting. They will be discussing "Amateur Radio Now and in the Future." There may be show and tell pieces available.

Rick then introduced the guest speaker for the evening, Congressman David Price. He represents the 4th congressional district (Wake, Chatham, and Orange Counties). After discussing Amateur radio related issues that are currently before Congress, the Congressman entertained questions from the membership. Thanks to Tom N4IZE for arranging the Congressman's visit.

Reed Whitten AB4W then presented Congressman Price with a Certificate of Merit for his support of Amateur radio in Congress.

Alan AB4OZ gave the hamfest report.

Door prizes were drawn by Joshua Foster and went to N4HAF, W4YC, KD4ZVW, KE4LEH, KC4UPS, KE4DRI, and K4DRT.

On motion by KD4YU seconded by W4VFJ, the meeting adjourned at 9:05p.

Jeff Wittich, AC4ZO, Secretary

Amateur Radio - A National Resource

Raleigh Amateur Radio Society, Inc.
P.O. Box 17124
Raleigh, NC 27619

Address correction requested.

First Class Mail

THE LITTLEWOOD FAMILY K4HF
2005 QUAIL RIDGE ROAD
Raleigh NC 27609
6/30/95

Calendar of Events: October 1994

Oct 1,2:	VK/ZL/Oceana DX Contest, phone, see Sept. QST
Oct 4:	**Regular RARS Meeting, 7:30pm, Forest Hills Baptist Church, *with exams*, pre-reg w/Vince AA4MY, 847-8512**
Oct 8:	**Annual RARS picnic, see page 1**
Oct 8,9:	VK/ZL/Oceana DX Contest, cw, see above
Oct 9:	Maysville, NC Hamfest, info, Alan AB4OZ, 787-1111
Oct 12-14:	Young Lady Anniversary Party, cw, see Sept QST
Oct 12:	**RARS VHF/UHF SIG meeting, info, Woody KJ4SO, 848-1844**
Oct 13:	Triangle Amateur TV Assoc., info, Brian KD4BJF, 554-1279
Oct 15:	Annual ARRL Simulated Emergency Test, contact your County EC (ARES) to help
Oct 16:	1st Annual Ol-Fashum Hamfest & BBS, Monroe, NC
Oct 17:	**RARS Scanner/Shortwave Listening SIG, info, Curt KD4YU, 772-0207**
Oct 18:	**RARS Advisory Board Meeting, 7pm, Forest Hills Baptist Church, ALL RARS MEMBERS WELCOME!**
Oct 19:	**RARS DX SIG/Swan Isl. DX Assoc., info, Paul NO0T, 847-8330**
Oct 26:	**RARS Homebrew SIG, info, Bob NA4G, 846-0069**
Oct 29,30:	CQ World-Wide DX contest